152.

3C
SKD
SKD/KKS
BC/RND/JM
SI/DA
FLYK/WT

FILED

2001 AUG -6 P 3:02

PUBLIC UTILITIES COMMISSION

BEFORE THE

PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Application of	)	
	)	
HAWAIIAN ELECTRIC COMPANY, INC.	)	DOCKET NO. 2006-0386
	)	
For Approval of Rate Increases and Revised Rate Schedules and Rules	)	
	)	

DIRECT TESTIMONY AND EXHIBITS OF

MAURICE BRUBAKER

ON BEHALF OF

THE UNITED STATES DEPARTMENT OF DEFENSE

AND

CERTIFICATE OF SERVICE

RANDALL Y.K. YOUNG
Associate Counsel (Code 09C)
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Pearl Harbor, HI 96860-3134
Telephone (808) 472-1195

ATTORNEY FOR
DEPARTMENT OF DEFENSE

DOD T-3

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

In the Matter of the Application of HAWAIIAN ELECTRIC COMPANY, INC. For Approval of Rate Increases and Revised Rate Schedules and Rules	)	Docket No. 2006-0386

Direct Testimony and Exhibits of

Maurice Brubaker

On behalf of

The United States Department of Defense

August 6, 2007

BRUBAKER & ASSOCIATES, INC.
ST. LOUIS, MO 63141-2000

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

In the Matter of the Application of HAWAIIAN ELECTRIC COMPANY, INC. For Approval of Rate Increases and Revised Rate Schedules and Rules	Docket No. 2006-0386

Table of Contents to the
Direct Testimony of Maurice Brubaker

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII**

In the Matter of the Application of **HAWAIIAN ELECTRIC COMPANY, INC.** **For Approval of Rate Increases and Revised Rate Schedules and Rules**	**Docket No. 2006-0386**

Direct Testimony of Maurice Brubaker

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Maurice Brubaker. My business address is 1215 Fern Ridge Parkway, Suite 208, St. Louis, Missouri 63141-2000.

Q. WHAT IS YOUR OCCUPATION?

A. I am a consultant in the field of public utility regulation and president of Brubaker & Associates, Inc. (BAI), energy, economic and regulatory consultants.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I have been involved in the regulation of electric utilities, competitive issues and related matters over the last three decades. Additional information is provided in Appendix A, attached to this testimony.

INTRODUCTION AND SUMMARY

Q. ON WHOSE BEHALF ARE YOU APPEARING IN THIS PROCEEDING?

A. BAI is under contract with the United States Department of the Navy, Utility Rates and Studies Office, to perform utility cost allocation, cost of service, rate design and other special studies. The Navy represents the Department of Defense and all other Executive Agencies of the Federal Government (DOD) in certain assigned geographical areas. The DOD installations on Hawaii are major purchasers of electricity from Hawaiian Electric Company (HECO), and most of DOD's electricity is purchased under the PT and PP rate schedules.

Q. WHAT SUBJECTS ARE ADDRESSED IN YOUR TESTIMONY?

A. My testimony addresses class cost of service, revenue allocation and rate design issues. I also address the Energy Cost Adjustment Clause (ECAC). Other witnesses appearing for the DOD will address cost of capital and accounting issues.

Q. DOES THE REVENUE REQUIREMENT, WHICH YOU HAVE USED FOR PURPOSES OF YOUR COST OF SERVICE, REVENUE ALLOCATION AND RATE DESIGN ANALYSIS, TAKE INTO ACCOUNT ADJUSTMENTS PROPOSED BY OTHER DOD WITNESSES?

A. No, it does not. For ease of comparison and to illustrate costing and rate design principles, I have utilized the revenue requirement claims that have been made by HECO. Use of those numbers is strictly for that purpose, and should not be interpreted as an endorsement of HECO's claims. In the final analysis, all

adjustments found appropriate by the Commission should be incorporated into the cost of service study.

Q. HAVE YOU ADJUSTED HECO'S ORIGINAL FILING FOR THE UPDATES HECO HAS MADE?

A. No. I have reviewed the limited updates that HECO provided, and the changes are so minor that they would not impact on the class cost of service, revenue allocation and rate design issues. Accordingly, for simplicity and ease of comparison I have utilized the class cost of service study associated with HECO's initial filing.

CONCLUSIONS AND RECOMMENDATIONS

Q. WHAT ARE YOUR CONCLUSIONS AND RECOMMENDATIONS?

A. My conclusions and recommendations may be summarized as follows:

1. The embedded cost methodology employed by HECO is generally consistent with industry practice and is suitable for use in this proceeding.

2. The proposed across-the-board increase does not move classes closer to cost of service; instead, it moves all the major classes further away from cost.

3. The Commission should direct that the rate increase resulting from this proceeding be allocated in such a way that it meaningfully reduces existing interclass subsidies.

4. The voltage-differentiated analysis of Schedule P shows that the PS, PP and PT customers should receive the same percentage increase.

5. Within Schedule P Primary (PP), an additional distinction should be made to recognize that service is provided in two ways. In some instances, a customer is served at the primary voltage level from a HECO-owned singe-customer substation that is fed from the transmission system. In other instances, a customer receives service at the primary voltage level from HECO's primary distribution circuits. It is more costly to provide this distribution primary service than it is to provide the substation service. This further refinement should be made within Schedule PP, and is described on Exhibits DOD-307 and DOD-308.

GENERAL CONCEPTS AND PRINCIPLES

Q. BEFORE DISCUSSING IN DETAIL YOUR ANALYSIS AND RESULTS, PLEASE DESCRIBE THE GENERAL PRINCIPLES AND PROCEDURES THAT SHOULD BE FOLLOWED IN COST OF SERVICE, REVENUE ALLOCATION AND RATE DESIGN.

A. Cost of service means the total of the directly assignable costs plus the appropriately allocated share of the other costs that go to each customer class. It also encompasses the rate design and means that to the extent possible the elements of the rate structure (i.e., customer, demand and energy charges) also should reflect costs.

Q. PLEASE BRIEFLY SUMMARIZE WHY YOU BELIEVE IT IS IMPORTANT THAT THE ALLOCATION OF REVENUE REQUIREMENTS TO CLASSES AND THE DESIGN OF RATES BE BASED ON COST.

A. The use of cost as a basis for allocating the total revenue requirement among classes is critical for three reasons. First, it is the only objective definition of basic fairness. The premise is that each customer should pay costs associated with its consumption, but not that of others. Because individual rate schedules for each customer are not practical, it is necessary to group customers into classes. Therefore, the first step in ensuring that each customer pays only costs associated with its own purchases is to make sure that the revenue requirement of the class follows this same principle.

Second, if the allocation of revenues to classes departs from cost, efficiency suffers. Class revenues are used as the basis for designing the specific rates that provide critical information to customers about the cost consequences of their

purchase decisions. If these signals are distorted because the rates are designed on class revenues that are not closely related to class costs, customers will make inefficient choices concerning their use of resources (not just electricity, but competing energy sources and energy efficiency options). The resulting wasteful use of resources is a bad result for the customer, the utility, the state of Hawaii and society in general.

Third, an allocation of revenues to classes that is not based on cost will result in revenue instability for the utility. The utility will only recover the test year revenue requirement from a class if the actual billing units happen to exactly equal those estimated for the test year. If class revenues and rates track costs, then changes in class revenues and costs will move in step when actual consumption differs from test year consumption, and the utility will remain whole. If, however, the revenue requirement of a particular class is less than cost and that class grows relative to the test year assumptions, the result will be a revenue shortfall for the utility, which will lead to another rate case and higher rates for all customers.

For much the same reasons, the design of the customer, demand and energy charges within each tariff should also be guided by cost of service. This is appropriate not only to charge customers the appropriate share of costs, but also to give customers the proper price signal so they can make rational decisions.

Q. WHAT KIND OF CLASS COST OF SERVICE STUDIES DID HECO FILE?

A. HECO filed an embedded cost of service study and a marginal cost of service study.

Q. ARE THERE FUNDAMENTAL DIFFERENCES BETWEEN THE TWO KINDS OF STUDIES?

A. Yes. An embedded cost of service study allocates the costs which a utility actually incurs to provide service (based on an historic period or, as here, a projected test year) to customer classes based on factors that reflect how customers cause the utility to incur costs.

A marginal cost study, on the other hand, does not represent the utility's actual costs or revenue requirement and cannot be calculated in a straightforward manner. It is an estimate of the cost to serve "one more" customer, "one more" kilowatt of demand or "one more" kilowatthour of energy. In addition, if marginal costs are calculated for each customer class, and then added together, the sum of these costs will not equal the utility's revenue requirement. Therefore, even after marginal costs are calculated, a process must be developed to reconcile these calculated marginal costs to the utility's revenue requirement – otherwise setting rates equal to calculated marginal cost would produce an under-recovery of revenues or an over-recovery of revenues.

Q. WHICH IS THE PREFERABLE APPROACH TO DETERMINING CLASS COST OF SERVICE?

A. In my view, an embedded cost of service study is the appropriate approach. It is a reflection of costs actually incurred, not a theoretical construct based on the cost of serving "one more" customer, kW or kWh.

Q. HOW DO YOU ADDRESS THE THEORETICAL ARGUMENTS THAT SOME WOULD SAY SUPPORT THE USE OF MARGINAL COSTS OVER EMBEDDED COSTS?

A. The underpinning of the theoretical justification for the use of marginal cost is the assumption that all other goods and services in the economy are priced at their respective marginal cost. This obviously is a situation which is unlikely to exist. Furthermore, the marginal costs consistent with economic theory are the marginal "social" costs and not the real world economic costs. Social costs would, for example, exclude income taxes, which are simply transfer payments and not resource costs. Thus, the economic justification for marginal cost pricing exists only in theory.

Q. WHAT IS YOUR RECOMMENDATION?

A. Based on these considerations I recommend that the Commission utilize HECO's embedded class cost of service study as the basis for determining class revenue requirements.

HECO'S EMBEDDED COST OF SERVICE STUDY

Q. HAVE YOU REVIEWED HECO'S EMBEDDED CLASS COST OF SERVICE STUDY AS PRESENTED BY WITNESS PETER YOUNG?

A. Yes, I have.

Q. DO YOU HAVE ANY OVERALL COMMENTS WITH RESPECT TO HECO'S EMBEDDED CLASS COST OF SERVICE STUDY?

A. Yes. In general, the HECO class cost of service study uses reasonable methods. I have reviewed the principal separations of costs between fixed and variable and the fixed costs between demand-related and customer-related costs. These are reasonable and consistent with general industry practice.

Basic Steps in a Cost of Service Study

Q. PLEASE BRIEFLY DESCRIBE THE STEPS OF FUNCTIONALIZATION, CLASSIFICATION AND ALLOCATION.

A. Functionalization refers to the grouping of costs into the major aspects of a utility's operation; namely, production, transmission, distribution, customer and general.

Classification refers to the identification of the functionalized costs as being demand-related, energy-related or customer-related in nature.

Allocation refers to the development of factors to be applied to the various revenue requirement elements (after they have been functionalized and classified) in order to develop the cost of serving each of the various customer classes.

Q. PLEASE DEFINE DEMAND, ENERGY, AND CUSTOMER, AS THESE TERMS APPLY TO ELECTRIC UTILITY COST OF SERVICE.

A. Demand is analogous to speed, which measures how fast one is traveling. Likewise, a customer's demand indicates the rate of energy consumption; that is, how much energy is being consumed at that moment. Demand is an extremely important concept in electric utility operations because it establishes the size of the production

facilities (or purchased power capacity), as well as the size of the transmission and distribution facilities which must be provided to meet customer demands the instant that they arise.

Energy-related costs are those which basically vary with the number of kilowatthours sold, such as the fuel and other variable components of purchased power cost. Whereas demand is analogous to the speed or rate of travel, energy is analogous to the distance traveled.

Customer-related costs are those which are incurred simply as a consequence of serving a customer, irrespective of the demand imposed and the amount of energy consumed. Examples are the cost of meters, service drops, and customer meter reading, billing and accounting expenses. Also, a significant portion of the distribution system is required simply to make power available throughout the utility's service territory, regardless of the level of demands, and is therefore also considered customer-related.

Customer-Related and Demand-Related Costs

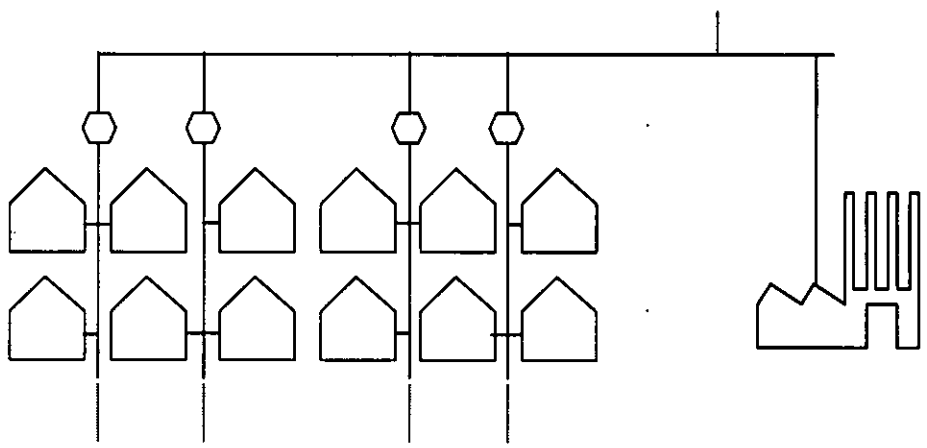
Q. PLEASE ELABORATE FURTHER ON THE DISTINCTION BETWEEN CUSTOMER-RELATED COSTS AND DEMAND-RELATED COSTS IN THE CONTEXT OF A CLASS COST OF SERVICE STUDY.

A. A certain portion of the cost of the distribution system–poles, wires and transformers–is required simply to attach customers to the system, regardless of their demand or energy requirements. This minimum or "skeleton" distribution system may also be considered a customer-related cost since it depends primarily on the number of customers, rather than demand or energy usage.

Figure 1, as an example, shows the distribution network for a utility with two customer classes, A and B. The physical distribution network necessary to attach Class A is designed to serve 12 customers, each with a 10-kilowatt load, having a total demand of 120 kW. This is the same total demand as is imposed by Class B, which consists of a single customer. Clearly, a much more extensive distribution system is required to attach the multitude of small customers (Class A), than to attach the single larger customer (Class B), despite the fact that the total demand of each customer class is the same.

Even though some additional customers can be attached without additional investment in some areas of the system, it is obvious that attaching a large number of customers requires investment in facilities, not only initially but on a continuing basis as a result of the need for maintenance and repair. Thus, the distribution system is classified as both demand-related and customer-related.

Figure 1
Classification of Distribution Investment



Total Demand = 120 kW
Class A

Total Demand = 120 kW
Class B

Q. IS THIS COST OF SERVICE APPROACH WHICH YOU HAVE DESCRIBED USED THROUGHOUT THE ELECTRIC UTILITY INDUSTRY?

A. Yes. Every logical cost analysis must use the procedures of functionalization, classification, and finally, allocation to classes.

Q. DOES THE APPLICATION OF THESE COSTING PRINCIPLES RESULT IN DIFFERENCES IN THE PER UNIT COST OF SERVING DIFFERENT TYPES OF CUSTOMERS?

A. Yes. Typically, large users, such as those taking service on Schedules PT and PP, are less costly to serve than other customers because of differences in:

1. level on the system where the customer is served;
2. load factor; and
3. size.

These differences are evident in HECO's cost of service studies.

Q. WHAT IS THE LEVEL ON THE SYSTEM WHERE THE CUSTOMER IS SERVED AND HOW DOES IT AFFECT COST OF SERVICE?

A. The system level at which service is provided refers to where on the system the customer is electrically and physically located. Rate PT customers take service from the high voltage transmission system through substations that they own. This means that HECO must invest only in the generation system and the transmission lines and bulk substations. Other customers take service at lower voltage levels, which may require such additional investment as distribution step-down substations, primary lines, secondary transformers, and secondary lines.

When power is delivered at a high voltage level HECO avoids making the investment in the lower voltage distribution system facilities that are required to serve

other customers. Also, the higher the voltage level the lower the losses incurred in moving the power from the generator to the customer because of the lesser number of transformations involved and the shorter distances. This also reduces the cost of providing the service.

I will discuss this issue in more detail when I address the design of the "P" group of rate schedules.

Q. WHAT IS LOAD FACTOR AND HOW DOES IT AFFECT COST OF SERVICE?

A. Load factor measures the intensity of use of the demand placed on the system. It is the ratio between the kilowatthours actually used and the kilowatthours that would have been used had the maximum demand been experienced during the entire year. Customers with a steady use will have a high load factor, while customers with erratic loads or seasonal or daily variations will have a lower load factor. A customer with a high load factor makes much more efficient use of the capacity which is required to meet the maximum demands, and therefore permits the fixed costs to be spread over more kilowatthours of output. This has the effect of reducing the per unit cost of service.

Q. HOW DOES SIZE AFFECT COST OF SERVICE?

A. Customer size affects cost of service by allowing costs which are relatively fixed–such as meter reading, billing and postage–to be spread over more kilowatthour sales, thereby reducing the per unit cost.

In addition, larger customers typically are served from larger transformers than are smaller customers. The investment associated with large capacity transformers, per unit of capability, is generally less than the cost per unit of capability associated

with smaller facilities. Thus, customer size produces certain economies in these facilities, and thereby reduces cost of service.

Allocation of Generation Costs

Q. WHAT ARE THE MOST INFLUENTIAL ALLOCATORS IN A CLASS COST OF SERVICE STUDY?

A. The most influential allocators, in terms of affecting the results, are the allocation of fuel and other energy-related costs, and the allocation of fixed costs associated with the generation and transmission systems.

HECO has allocated the fuel, variable purchased power charges and other variable costs using class energy consumption, adjusted for losses to the level of service at which each customer class receives electricity.

The fixed costs associated with the generation and transmission system have been allocated to classes using what is known as the average and excess demand allocation methodology (AED). As Mr. Young explains, under this methodology class average demands and class maximum demands are taken into account. The allocation factor has two components. The first component is the average demand of each class. The second component is the difference between the maximum demand of a class and the classes' average demand. The average component is given a weighting equal to the utility system load factor, and the excess component is given a weighting equal to one minus the system load factor.

Q. IS THIS AED METHODOLOGY APPROPRIATE FOR THE HECO SYSTEM?

A. Yes. The HECO system has a relatively high load factor, has relatively low seasonality (which means that there are not pronounced differences among the peak demands for the 12 months of the year), and has a fairly broad peak on the peak days (meaning that loads are at or near the maximum demand for an extended period of time on the day of the monthly system peak). Given these load characteristics the AED allocation methodology continues to be appropriate for the HECO system.

COST OF SERVICE RESULTS

HECO's Proposed Increase

Q. WHAT IS SHOWN ON EXHIBIT DOD-301?

A. This exhibit shows how HECO has proposed to allocate its proposed revenue increase. Column 1 shows the revenues under the currently effective rates, which are the rates in effect as a result of the interim increase granted in September 2005 in Docket No. 04-0113. Column 2 shows the proposed dollar increase and Column 3 shows the percentage increase. Essentially, Exhibit DOD-301 shows that HECO has proposed an equal percentage increase over these currently effective rates.

Q. IS AN EQUAL PERCENTAGE INCREASE APPROPRIATE?

A. No. To understand why, please refer to Exhibit DOD-302. This exhibit shows the results of HECO's cost of service study at currently effective rates. In addition to the information shown in HECO's exhibits, I have added a Column 7, which is called "subsidy."

Subsidies

Q. WHAT DOES THE SUBSIDY REPRESENT?

A. The subsidy indicates the revenue dollars by which a rate schedule or group deviates from the level required to produce the system average rate of return, or in other words, to pay its cost of service, no more and no less.

A negative number means that a class is below its cost of service, while a positive number indicates that a class is above its cost of service. With the exception of the relatively small Schedule F and H classes, only the residential class (Schedule R) is below cost. Considering these significant differences from cost, an across-the-board increase is simply not appropriate because it will not move rates closer to cost.

Q. CAN YOU ILLUSTRATE?

A. Yes. Please refer to Exhibit DOD-303. Calculations on this exhibit are similar to those on the previous one, except that all the numbers relate to the cost of service results at HECO's proposed rates which are derived by application of an equal percentage or across-the-board increase to all classes.

Q. WHAT MOVEMENTS TOWARD OR AWAY FROM COST OF SERVICE ARE PRODUCED BY THIS ACROSS-THE-BOARD ALLOCATION?

A. Please refer to Exhibit DOD-304. Columns 1 and 2 show the subsidies at present rates and at HECO's proposed rates, and are taken from the two preceding exhibits. Column 3 shows the amount of change in the subsidy, and Column 4 shows the direction of change. Only the relatively small Schedule G moves closer to cost. All of

the other classes move further away from cost. Those that are below cost now, namely Schedules R, F and H, are further below cost with the across-the-board increase. All of the other schedules which are above cost move further above cost, except for the relatively small Schedule G.

Q. HAVE YOU CALCULATED HOW HECO'S PROPOSED INCREASE WOULD NEED TO BE ALLOCATED IN ORDER TO MAKE SOME MEANINGFUL MOVEMENT TOWARD COST OF SERVICE?

A. Yes, I have. Exhibit DOD-305 shows how HECO's proposed increase would need to be distributed in order to move each class 100% of the way to cost of service. In other words, to reduce the existing subsidies to zero, rather than to increase them significantly. As compared to an overall average increase of roughly 7%, class and group increases would range from approximately 3% (Schedule J) to about 17% (Schedule F).

Exhibits DOD-306 and DOD-307 show that somewhat smaller increases to the classes that are below cost would be required to move 50% and 25%, respectively, of the way to cost of service.

Service Levels Within Schedule P

Q. I NOTE THAT WITHIN YOUR PRECEDING EXHIBITS YOU HAVE SHOWN SCHEDULES PS, PP AND PT GROUPED TOGETHER AND THEN TOTALED. WHAT IS THE ORIGIN OF THESE RATE SCHEDULES?

A. Prior to the summer of 2001, HECO had a rate schedule "P." Within Schedule P there were various adjustments for different voltage levels and methods of service.

In the summer of 2001, HECO applied for and received approval to create three separate rate schedules. These three schedules were revenue neutral to each customer and simply reconfigured how the rate was presented in the tariffs. Instead of having a single rate with a number of service and voltage level adjustments, HECO created three tariffs with adjustments depending on whether the customer's consumption was metered at the high voltage side of the step-down substation, or at the low voltage side.

Q. PRIOR TO THE SEPARATION OF SCHEDULE P, DID HECO ATTEMPT TO SEPARATELY IDENTIFY THE COSTS ASSOCIATED WITH EACH OF THESE THREE GROUPS?

A. No. Historically, the class cost of service study looked at Schedule P as a single group. It did not attempt to separately cost out the service supplied to customers at transmission, primary and secondary voltages.

Q. WHEN DID HECO FIRST PRESENT A COST OF SERVICE STUDY THAT SEPARATELY IDENTIFIED THE COSTS AT EACH OF THESE VOLTAGE LEVELS?

A. HECO first presented a cost of service study that identified costs by voltage level in the preceding rate case, Docket No. 04-0113.

Q. WHAT DID THAT COST OF SERVICE STUDY SHOW?

A. It showed that the rate of return on Schedule PT was substantially higher than the rate of return on Schedules PS and PP.

Q. WHAT ACCOUNTS FOR THE FACT THAT IN THIS CASE THE RATES OF RETURN FOR THE THREE VOLTAGE LEVELS ARE SUBSTANTIALLY CLOSER TOGETHER AND THAT WITH AN EQUAL PERCENT INCREASE OVER CURRENTLY EFFECTIVE RATES, THE RATES OF RETURN ARE NEARLY IDENTICAL?

A. This is accounted for by two factors. First, Schedule PT has a relatively low amount of investment per dollar of revenue because of the fact that it doesn't use the distribution system and that it has a high load factor which means that fuel costs are a large percentage of the total cost of service. Thus, an equal percentage increase on the total revenues from this class causes the rate of return to increase much faster than for other schedules within the "P" group, namely PS and PP, and other rate schedules.

The second factor is that the high rate of return on Schedule PT was recognized in the stipulation entered into among the parties in the last case. This stipulation, which was approved by the Commission, did not allocate any part of the interim increase to Schedule PT.

Taken together, these circumstances have largely corrected the high rate of return problem that Schedule PT customers were experiencing in relation to Schedule PS and PP customers.

Q. WHAT ARE THE IMPLICATIONS FOR INCREASING THE VARIOUS SCHEDULES WITHIN THE SCHEDULE P CLASS IN THIS CASE?

A. As clearly shown by Exhibits DOD-303, DOD-305, DOD-306 and DOD-307, the same percentage increase would appropriately be applied to each of Schedule PS, PP and PT.

RECOMMENDED ALLOCATION OF ANY INCREASE

Q. WHAT IS YOUR RECOMMENDATION FOR THE ALLOCATION OF ANY INCREASE THAT HECO MAY RECEIVE OVER THE CURRENTLY EFFECTIVE RATES?

A. I recommend that the Commission direct HECO to implement any approved rate increase by allocating the revenue increase among customer classes (viewing Schedule P in total) with the objective of reducing the existing interclass subsidies These increases at HECO's requested revenue requirement are shown on Exhibits DOD-305 through DOD-307.

RATE DESIGN ISSUES

Design of Schedules PS, PP and PT

Q. HAVE YOU GENERALLY REVIEWED HOW HECO PROPOSES TO ADJUST THE CHARGES WITHIN RATES PS, PP AND PT IN ORDER TO ACHIEVE ITS PROPOSED REVENUE TARGET?

A. Yes. HECO has adjusted the charges within these rates in a manner that moves both demand charges and energy charges toward the unit costs of demand and energy, respectively, as revealed in its cost of service studies. The overall basic design of the rate schedules has been retained.

Q. DO YOU AGREE WITH HECO'S ADJUSTMENTS WITHIN THESE RATE SCHEDULES?

A. Yes. While I disagree with the amount of revenue assigned to these schedules, I believe that the general design of the rates which HECO has followed is appropriate.

By moving the demand and energy charges closer to their respective unit costs, the price signals given to customers are improved and equity also is improved within the rates as customers with different characteristics will be more appropriately priced in relation to the costs which they impose on the system.

Recognition of Additional Characteristics Within Rate Schedule PP

Q. YOU HAVE PREVIOUSLY DISCUSSED THE THREE PRINCIPAL GROUPINGS OF CUSTOMERS WITHIN WHAT WAS FORMERLY SCHEDULE P. DO YOU BELIEVE THAT THE THREE GROUPINGS OF CUSTOMERS PROVIDES AN ADEQUATE RECOGNITION OF COST, CONSIDERING THE VARIOUS WAYS SERVICE IS PROVIDED UNDER SCHEDULE P?

A. No. While I believe the Schedule PT and PS tariffs are appropriate, an additional distinction should properly be made within Schedule PP.

Q. PLEASE EXPLAIN.

A. Please refer to Exhibit DOD-308. On the left side of the exhibit is shown how the PT customers receive service. They receive service directly from HECO's transmission system through a substation that is owned by the customer.

In the center is shown a Schedule PP customer that is served at a primary voltage but is fed from a HECO-owned dedicated single customer substation that also is fed from the transmission system.

The third manner of service is shown on the right hand side and illustrates a Schedule PP customer that also receives service at the primary voltage level, but in addition to a substation requires the use of a primary distribution line. Both

Schedule PP customers pay the same rate in HECO's tariffs, even though the cost to serve the customer in the center is lower because there are fewer losses and less investment in equipment. It is appropriate to make a distinction within the PP group of customers to recognize this dedicated single customer substation service, which is less costly to provide than service from primary distribution circuits.

Q. WAS THIS DIFFERENCE RECOGNIZED IN THE PRIOR HECO RATE CASE?

A. Yes. DOD raised this issue in its testimony. In the stipulation which resolved the case, HECO agreed that it would be appropriate to reflect in Schedule PP a differential to recognize these characteristics. Although the differential was recognized in concept, an actual adjustment to the rates has not gone into effect because the Commission has not issued a final decision in that case.

Q. HAS HECO PROPOSED TO RECOGNIZE THAT DIFFERENTIAL IN THIS CASE?

A. Yes. HECO has proposed to recognize that differential by means of a credit of $1.75 per kW-month to customers taking service at the low side voltage of a dedicated customer substation.

Q. IS THE CREDIT PROPOSED BY HECO SUFFICIENT TO RECOGNIZE THE COST DIFFERENCES?

A. No.

Q. HAVE YOU ESTIMATED WHAT DIFFERENCE IN PRICE WOULD BE APPROPRIATE?

A. Yes. This is summarized on Exhibit DOD-309. Line 1 shows the test year billing determinants for Rate Schedule PP separately for customers receiving dedicated substation service and those receiving regular primary distribution service.

HECO's workpaper 2001, page 8, shows that the cost of distribution primary lines included in the PP schedule is roughly $2 per kW-month. Since customers served from dedicated substations do not utilize primary lines, it is appropriate that these customers receive an average cost per kW of billing demand that is approximately $2 per kW-month less than the average for Rate Schedule PP.

Q. HOW CAN THIS DIFFERENTIAL BE RECOGNIZED?

A. Please refer to line 2 of Exhibit DOD-309. To maintain revenue neutrality within Rate Schedule PP, a $2 credit per kW-month for dedicated substation customers can be compensated by a $1.38 per kW-month surcharge on the regular primary distribution service customers on Schedule PP. Providing the dedicated substation customers a credit, and adding a surcharge to regular primary distribution customers, is one means of recognizing this cost differential.

Q. HOW ELSE CAN THE DIFFERENTIAL IN COST BE RECOGNIZED?

A. HECO prefers a different approach. HECO prefers to embed the credit into the demand charges, and charge a higher basic rate to all customers, dedicated substation customers as well as regular primary distribution customers. It then would provide a larger credit to the dedicated substation customers, from the higher rates. The end result is the same. In that context, it would be appropriate to have a credit of

$3.38 per kW-month applicable to customers who are served from a dedicated substation.

Q. AT THE LEVEL OF HECO'S PROPOSED RATES, WHAT WOULD BE THE APPROPRIATE DEMAND CHARGES FOR HECO'S SCHEDULE PP?

A. This is shown at the bottom of Exhibit DOD-309.

ENERGY COST ADJUSTMENT

Q. HAVE YOU REVIEWED HECO'S PROPOSED CHANGES TO THE ENERGY COST ADJUSTMENT CLAUSE (ECAC)?

A. Yes, I have.

Q. BESIDES CHANGING THE COST LEVELS AND MIX BETWEEN GENERATION AND PURCHASED POWER TO REFLECT TEST YEAR VALUES, HAS HECO PROPOSED ANY FUNDAMENTAL CHANGES TO THE ECAC?

A. There are a couple of minor changes that are proposed.

Q. PLEASE DESCRIBE THOSE CHANGES.

A. Generally, the changes proposed are to refine the calculation of fuel costs by separately identifying efficiency factors for different kinds of generation, and to flow the fuel costs of distributed generation (DG) through the ECAC without application of an efficiency factor.

Q. PLEASE DESCRIBE THE PROPOSED CHANGES IN THE EFFICIENCY FACTOR APPLICABLE TO HECO GENERATION.

A. Currently, there is a single weighted average efficiency factor which applies to all HECO generation.

Q. WHAT IS AN EFFICIENCY FACTOR?

A. The efficiency factor expresses the number of BTUs required to produce a kWh at a generation unit. The lower the efficiency factor number, the greater the actual efficiency of the generation unit.

Q. WHAT REFINEMENT IS HECO PROPOSING IN THE ESTABLISHMENT OF THE EFFICIENCY FACTOR?

A. HECO is proposing to establish three separate efficiency factors. There would be one factor for the base oil-fired generation, another for diesel generation and a third for other generation.

Q. IS IT APPROPRIATE TO MAKE THESE DISTINCTIONS?

A. Yes. The efficiency factors between the diesel units and the base units are dramatically different. The purpose of the efficiency factor is to give HECO an incentive to improve the operations of its generating units, by holding this factor constant. If HECO is able to improve its generating unit operations, then it gets to retain that benefit until the next time the rates are reviewed in a rate case. On the other hand, if HECO's generating unit efficiency degrades, it is not able to pass the additional costs on to customers.

Given the purpose of the efficiency factor, it is reasonable to separately recognize the efficiency factors associated with the various types of generation because the objective is not to have HECO change its generation mix, but to improve the efficiency of operation of each of its generating units. Making the separation among the different types of generating units in this respect is therefore reasonable. While the overwhelming proportion of its generation is from base load oil-fired units (over 99%), the basic concept behind the separate identification and weighting is appropriate.

Q. WHAT IS HECO PROPOSING WITH RESPECT TO DG?

A. HECO proposes to separately flow through the actual cost per kWh associated with DG energy, in much the same way that the cost of purchased power is handled. The rationale for this is that the efficiency of DG is higher than the system average, so including these costs in with the fixed efficiency factor would not allow the benefits of this change in generation mix to flow through to customers. While a small refinement, I believe it is appropriate as it would produce a more accurate measure of total system costs and allow the benefits of the higher efficiency to flow through to customers in rates.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Qualifications of Maurice Brubaker

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Maurice Brubaker. My business address is 1215 Fern Ridge Parkway, Suite 208, St. Louis, Missouri 63141.

Q. PLEASE STATE YOUR OCCUPATION.

A. I am a consultant in the field of public utility regulation and President of the firm of Brubaker & Associates, Inc., energy, economic and regulatory consultants.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.

A. I was graduated from the University of Missouri in 1965, with a Bachelor's Degree in Electrical Engineering. Subsequent to graduation I was employed by the Utilities Section of the Engineering and Technology Division of Esso Research and Engineering Corporation of Morristown, New Jersey, a subsidiary of Standard Oil of New Jersey.

In the Fall of 1965, I enrolled in the Graduate School of Business at Washington University in St. Louis, Missouri. I was graduated in June of 1967 with the Degree of Master of Business Administration. My major field was finance.

From March of 1966 until March of 1970, I was employed by Emerson Electric Company in St. Louis. During this time I pursued the Degree of Master of Science in Engineering at Washington University, which I received in June, 1970.

In March of 1970, I joined the firm of Drazen Associates, Inc., of St. Louis, Missouri. Since that time I have been engaged in the preparation of numerous studies relating to electric, gas, and water utilities. These studies have included analyses of the cost to serve various types of customers, the design of rates for utility services, cost forecasts, cogeneration rates and determinations of rate base and operating income. I have also addressed utility resource planning principles and plans, reviewed capacity additions to determine whether or not they were used and useful, addressed demand-side management issues independently and as part of least cost planning, and have reviewed utility determinations of the need for capacity additions and/or purchased power to determine the consistency of such plans with least cost planning principles. I have also testified about the prudency of the actions undertaken by utilities to meet the needs of their customers in the wholesale power markets and have recommended disallowances of costs where such actions were deemed imprudent.

I have testified before the Federal Energy Regulatory Commission (FERC), various courts and legislatures, and the state regulatory commissions of Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Guam, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Michigan, Missouri, Nevada, New Jersey, New Mexico, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Texas, Utah, Virginia, West Virginia, Wisconsin and Wyoming.

The firm of Drazen-Brubaker & Associates, Inc. was incorporated in 1972 and assumed the utility rate and economic consulting activities of Drazen Associates, Inc., founded in 1937. In April, 1995 the firm of Brubaker & Associates, Inc. was formed.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Proposed Revenue Increase

Line	Rate Class	Revenues Under Currently Effective Rates (000) (1)	Proposed Increase Amount (000) (2)	Proposed Increase Percent (3)
1	Schedule R	$ 432,975.6	$ 30,589.3	7.06%
2	Schedule G	80,721.8	5,702.9	7.06%
3	Schedule J	372,286.2	26,301.6	7.06%
4	Schedule H	7,354.1	519.6	7.07%
5	Schedule PS	140,747.4	9,943.7	7.06%
6	Schedule PP	331,021.2	23,386.3	7.06%
7	Schedule PT	26,047.3	1,840.2	7.06%
8	Schedule P Total	497,815.9	35,170.2	7.06%
9	Schedule F	7,125.4	503.4	7.06%
10	Total Sales Revenue	1,398,279.0	98,787.0	7.06%
11	Other Operating Revenue	3,947.0	769.0	19.48%
12	Total	$1,402,226.0	$ 99,556.0	7.10%

It includes most of the former DBA principals and staff. Our staff includes consultants with backgrounds in accounting, engineering, economics, mathematics, computer science and business.

During the past ten years, Brubaker & Associates, Inc. and its predecessor firm has participated in over 700 major utility rate and other cases and statewide generic investigations before utility regulatory commissions in 40 states, involving electric, gas, water, and steam rates and other issues. Cases in which the firm has been involved have included more than 80 of the 100 largest electric utilities and over 30 gas distribution companies and pipelines.

An increasing portion of the firm's activities is concentrated in the areas of competitive procurement. While the firm has always assisted its clients in negotiating contracts for utility services in the regulated environment, increasingly there are opportunities for certain customers to acquire power on a competitive basis from a supplier other than its traditional electric utility. The firm assists clients in identifying and evaluating purchased power options, conducts RFPs and negotiates with suppliers for the acquisition and delivery of supplies. We have prepared option studies and/or conducted RFPs for competitive acquisition of power supply for industrial and other end-use customers throughout the Unites States and in Canada, involving total needs in excess of 3,000 megawatts. The firm is also an associate member of the Electric Reliability Council of Texas.

In addition to our main office in St. Louis, the firm has branch offices in Phoenix, Arizona; Corpus Christi, Texas; and Plano, Texas.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Summary of Class Rates of Return, Indexes and Subsidies at Currently Effective Rates

Line	Rate Class	Operating Revenues (000) (1)	Operating Expenses (000) (2)	Operating Income (000) (3)	Rate Base (000) (4)	Rate of Return (5)	Index[1] (6)	1.79794674 Subsidy[2] (000) (7)
1	Schedule R	$ 435,474.8	$ 423,232.8	$ 12,242.0	$ 519,497.0	2.36%	54	$ (18,672.9)
2	Schedule G	81,037.9	75,175.3	5,862.6	97,336.9	6.02%	138	2,917.9
3	Schedule J	372,903.2	353,990.7	18,912.5	277,377.6	6.82%	157	12,281.4
4	Schedule H	7,380.7	7,144.1	236.6	7,056.3	3.35%	77	(127.2)
5	Schedule PS	140,896.1	135,601.3	5,294.8	92,911.6	5.70%	131	2,243.6
6	Schedule PP	331,321.7	321,230.4	10,091.3	201,296.7	5.01%	115	2,379.5
7	Schedule PT	26,062.2	25,747.0	315.2	12,673.1	2.49%	57	(425.8)
8	Schedule P Total	498,280.0	482,578.7	15,701.3	306,881.4	5.12%	117	4,197.3
9	Schedule F	7,149.5	7,159.2	(9.7)	7,395.3	-0.13%	(3)	(596.6)
10	Total	$ 1,402,226.1	$ 1,349,280.8	$ 52,945.3	$ 1,215,544.5	4.36%	100	$ 0.0

Notes:

[1] An index below 100 means a class is below the system rate of return and would require an above average percent increase. An index above 100 means a class is above the system rate of return and would require a below average percent increase.

[2] A negative number indicates the amount of subsidy a class is receiving.
A positive number indicates the amount of subsidy a class is providing.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Summary of Class Rates of Return, Indexes and Subsidies at Proposed Rates

Line	Rate Class	Operating Revenues (000) (1)	Operating Expenses (000) (2)	Operating Income (000) (3)	Rate Base (000) (4)	Rate of Return (5)	Index[1] (6)	1.79794674 Subsidy[2] (000) (7)
1	Schedule R	$ 466,717.1	$ 437,109.0	$ 29,608.1	$ 519,107.0	5.70%	64	$ (30,029.5)
2	Schedule G	86,815.5	77,740.2	9,075.3	97,265.3	9.33%	105	715.8
3	Schedule J	399,235.4	365,669.2	33,566.2	277,053.1	12.12%	136	15,911.7
4	Schedule H	7,904.7	7,376.8	527.9	7,050.0	7.49%	84	(181.7)
5	Schedule PS	150,842.2	140,013.1	10,829.1	92,788.5	11.67%	131	4,587.1
6	Schedule PP	354,711.6	331,598.7	23,112.9	201,009.5	11.50%	129	9,314.4
7	Schedule PT	27,902.4	26,562.6	1,339.8	12,650.5	10.59%	119	379.8
8	Schedule P Total	533,456.2	498,174.4	35,281.8	306,448.5	11.51%	129	14,281.3
9	Schedule F	7,653.9	7,382.8	271.1	7,388.7	3.67%	41	(697.7)
10	Total	$ 1,501,782.8	$ 1,393,452.4	$ 108,330.4	$ 1,214,312.6	8.92%	100	$ (0.0)

Notes:

[1] An index below 100 means a class is below the system rate of return and would require an above average percent increase. An index above 100 means a class is above the system rate of return and would require a below average percent increase.

[2] A negative number indicates the amount of subsidy a class is receiving.
A positive number indicates the amount of subsidy a class is providing.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Comparison of Subsidies at
Currently Effective and Proposed Rates

Line	Rate Class	Subsidy at Currently Effective Rates (000) (1)	Subsidy at Proposed Rates (000) (2)	Change in Subsidy Amount (000) (3)	Change in Subsidy Direction of Change (4)
1	Schedule R	$ (18,672.9)	$ (30,029.5)	$ (11,356.6)	Further Below Cost
2	Schedule G	2,917.9	715.8	(2,202.1)	Closer to Cost
3	Schedule J	12,281.4	15,911.7	3,630.3	Further Above Cost
4	Schedule H	(127.2)	(181.7)	(54.5)	Further Below Cost
5	Schedule PS	2,243.6	4,587.1	2,343.5	Further Above Cost
6	Schedule PP	2,379.5	9,314.4	6,934.9	Further Above Cost
7	Schedule PT	(425.8)	379.8	805.5	Closer to Cost
8	Schedule P Total	4,197.3	14,281.3	10,084.0	Further Above Cost
9	Schedule F	(596.6)	(697.7)	(101.1)	Further Below Cost
10	Total	$ 0.0	$ (0.0)	$ (0.0)	

Note: A negative number indicates the amount of subsidy a class is receiving.
A positive number indicates the amount of subsidy a class is providing.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Increase Over Currently Effective Revenues to Reduce Subsidies by 100%

Line	Rate Class	Currently Effective Revenues (000) (1)	Required Increase Amount (000) (2)	Required Increase Percent (3)
1	Schedule R	$ 435,474.8	$ 61,271.8	14.07%
2	Schedule G	81,037.9	5,061.8	6.25%
3	Schedule J	372,903.2	10,420.5	2.79%
4	Schedule H	7,380.7	705.7	9.56%
5	Schedule PS	140,896.1	5,359.0	3.80%
6	Schedule PP	331,321.7	14,075.5	4.25%
7	Schedule PT	26,062.2	1,460.4	5.60%
8	Schedule P Total	498,280.0	20,894.9	4.19%
9	Schedule F	7,149.5	1,202.1	16.81%
10	Total	$1,402,226.1	$ 99,556.7	7.10%

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Increase Over Currently Effective Revenues to Reduce Subsidies by 50%

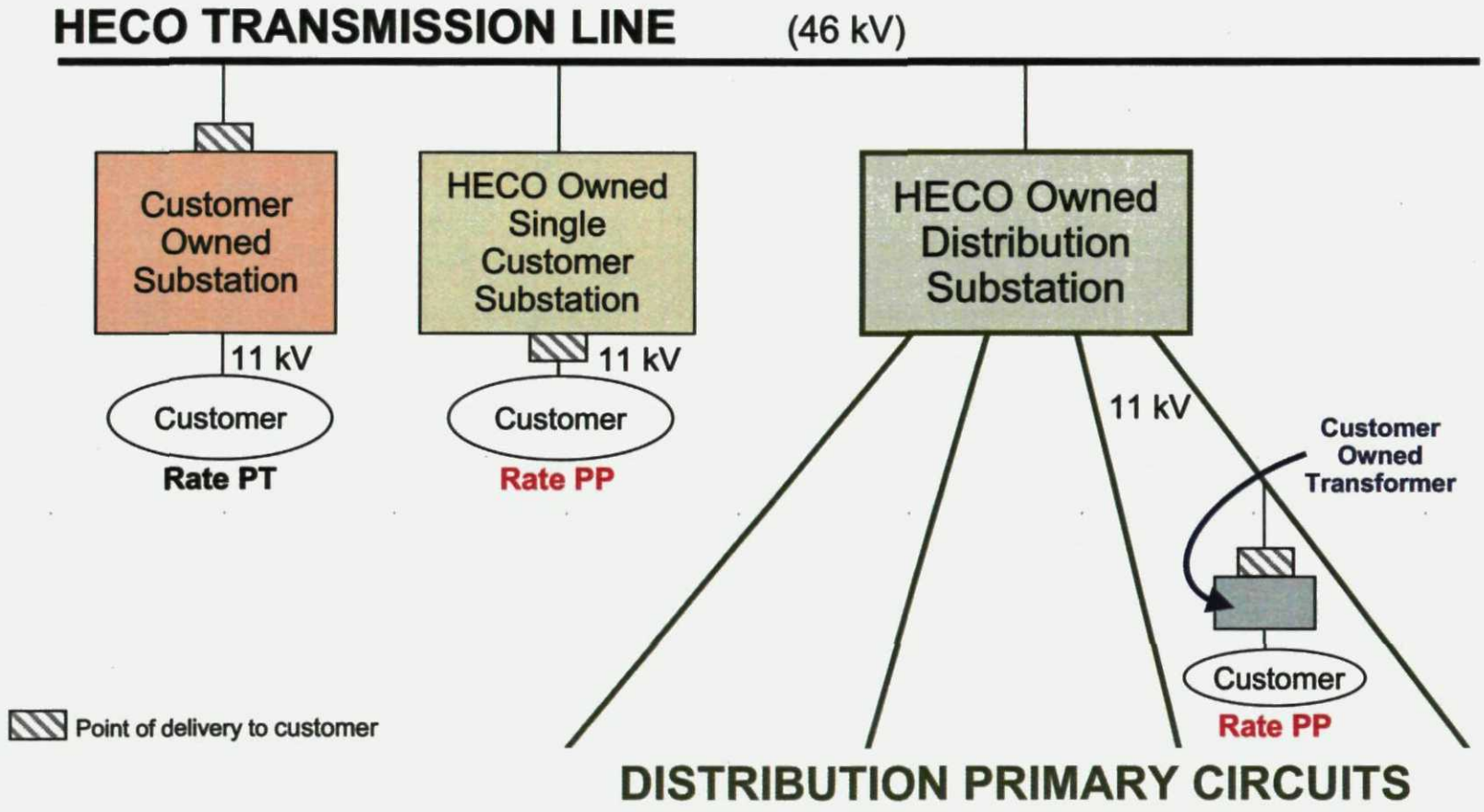
Line	Rate Class	Currently Effective Revenues (000) (1)	Required Increase Amount (000) (2)	Required Increase Percent (3)
1	Schedule R	$ 435,474.8	$ 51,935.4	11.93%
2	Schedule G	81,037.9	6,520.7	8.05%
3	Schedule J	372,903.2	16,561.2	4.44%
4	Schedule H	7,380.7	642.1	8.70%
5	Schedule PS	140,896.1	6,480.8	4.60%
6	Schedule PP	331,321.7	15,265.2	4.61%
7	Schedule PT	26,062.2	1,247.5	4.79%
8	Schedule P Total	498,280.0	22,993.5	4.61%
9	Schedule F	7,149.5	903.8	12.64%
10	Total	$1,402,226.1	$ 99,556.7	7.10%

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Increase Over Currently Effective Revenues to Reduce Subsidies by 25%

Line	Rate Class	Currently Effective Revenues (000) (1)	Required Increase Amount (000) (2)	Required Increase Percent (3)
1	Schedule R	$ 435,474.8	$ 47,267.2	10.85%
2	Schedule G	81,037.9	7,250.2	8.95%
3	Schedule J	372,903.2	19,631.6	5.26%
4	Schedule H	7,380.7	610.3	8.27%
5	Schedule PS	140,896.1	7,041.7	5.00%
6	Schedule PP	331,321.7	15,860.1	4.79%
7	Schedule PT	26,062.2	1,141.1	4.38%
8	Schedule P Total	498,280.0	24,042.9	4.83%
9	Schedule F	7,149.5	754.7	10.56%
10	Total	$1,402,226.1	$ 99,556.7	7.10%

Illustration of Service Provided Under Schedules PT and PP



HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386, TEST YEAR 2007

Voltage Level Refinement to Schedule "PP"

Line	Description	Dedicated Substation Customer (1)	Regular Primary Distribution Customer (2)	Total (3)
1	Test Year Billing Determinants (kW-Mo)	1,700,000	2,463,000	4,163,000
2	Cost-based Credit from Rate Average Cost per kW-Mo	$ (2.00)	$ 1.38	$ 3.38
	Demand Charges at HECO's Proposed Rate Level for Schedule PP			
3	First 500 kW			$ 19.16
4	Next 1,000 kW			$ 18.66
5	Additional kW			$ 17.66
6	Substation Credit			$ (3.38)

CERTIFICATE OF SERVICE

I hereby certify that one copy of the foregoing DIRECT TESTIMONY AND EXHIBITS OF MAURICE BRUBAKER ON BEHALF OF THE UNITED STATES DEPARTMENT OF DEFENSE was duly served upon the following parties, by personal service, hand-delivery, and/or U.S. mail, postage prepaid, and properly addressed pursuant to HAR sec. 6-61-21(d).

William A. Bonnet
Vice President, Government and Community Affairs
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dean K. Matsuura — 2 Copies
Director, Regulatory Affairs
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Thomas W. Williams, Jr., Esq.
Peter Y. Kikuta, Esq.
Goodsill Anderson Quinn & Stifel
1800 Alii Place
1099 Alakea Street
Honolulu, Hawaii 96813

Department of Commerce and Consumer Affairs — 6 Copies
State of Hawaii
Division of Consumer Advocacy
335 Merchant Street, Room 326
Honolulu, Hawaii 96813

DATED: Honolulu, Hawaii, August 6 2007

RANDALL Y.K. YOUNG
Associate Counsel
Naval Facilities Engineering Command, Pacific